Statement of Work
Task Order 47 Amendment

I. Title: **Assessing the Potential Environmental Benefits of Brownfield Redevelopment: A National Study**

II. Period of performance:
From: Date of issuance
To: December 29, 2015

III. Background

Previous research and case studies indicate that brownfield redevelopment can offer significant environmental benefits when compared to prevailing development patterns that focus on suburban expansion and greenfield development. These benefits include less water quality impacts from storm water runoff on impervious surfaces and less air quality and greenhouse gas impacts from vehicle travel. This study will attempt to estimate these impacts at a national scale.

Due to the novel and innovative nature of this work, the project team encountered several challenges and barriers which required that a majority of the hours be devoted to tasks such as validation of the data in the EPA ACRES database incorporating various data cleaning methods in order to make the data usable for the analysis. In addition, the original scope called for an initial analysis of 4 US metropolitan regions with an understanding that if this initial analysis was successful, then the analysis should be expanded to include a larger number of regions. Based on the success of the allocation mechanics for the beta test of Raleigh MSA, EPA and the contractor have determined that it would be advantageous to apply it to more regions.

At this time the contractor team has worked with EPA to complete 1 beta test of the analysis, including the allocation and scenario development.

In order to finish the project goals, the contractor shall take the necessary steps to broaden the focus nationwide. This will entail studying 15-20 regions and applying the analysis in these multiple settings to capture the largest realistic environmental benefits."

IV. Purpose and Objective

The purpose of this task order is to model the outcomes of two development scenarios, building off of several previous EPA studies focused on modeling the positive environmental benefits of brownfield and infill development.

- In 2001, EPA completed the report "Comparing Methodologies to Assess Transportation and Air Quality Impacts of Brownfields and Infill Development ," which outlined a general framework for

estimating the air quality implications of developing an infill location or Brownfield site when compared to prevailing development patterns. This report begins with the premise that each metropolitan region has a fixed demand for new housing and commercial development. From this perspective, infill development on a brownfield or underutilized parcel displaces an equivalent amount of development that would have occurred elsewhere within the same metropolitan region. The report describes four methods for determining a land use scenario based on prevailing development patterns for use in comparison to a brownfield or infill development scenario. This method reallocates development to the fastest growing parts of a region based on data about the most recent development trends in that region.

- The 2011 study "Air and Water Quality Impacts of Brownfields Redevelopment: A Study of Five (5) Communities " (EPA) evaluated air quality and non-point source water pollution impacts of Brownfield redevelopment in metropolitan areas: Baltimore, Dallas-Ft. Worth, Emeryville (CA), Minneapolis-St. Paul, and Seattle. Similar to the "Comparing Methodologies" report, the 2011 study compared the impacts of Brownfield developments to those that would be expected at alternative locations in growing parts of the region. The M2 methodology was used in the development of the alternative conventional development scenario, re-allocating the growth at Brownfield sites to the top ten percent fastest growing traffic analysis zones for each metropolitan area.

- A 2013 EPA study is summarized in the technical report entitled "Scenario Analysis Framework for Evaluation of EPA's Smart Growth Technical Assistance Efforts." This study evaluates the potential environmental benefits of smart growth development plans and policies adopted in nine regions that received EPA technical assistance. This study used the same framework as the two studies above to model and compare the outcomes of a smart growth scenario to another scenario based on prevailing regional development patterns. This study also adopted the M2 approach of reallocating growth in the prevailing development pattern scenario.

This study will model the outcomes of two development scenarios. Scenario One ("Brownfield Redevelopment") assumes brownfield sites will be prioritized for redevelopment according to regional development growth projections. Scenario Two ("Trend Growth") takes the same quantity of development found in Scenario One and assumes it takes place in accordance with prevailing regional development patterns.

To conduct this study at a national scale, the geographical basis of analysis will be CBSAs (Core Based Statistical Areas), which are urbanized areas consisting of counties or county-equivalents which contain a population of 10,000 or more. Just how many CBSAs are analyzed will be determined after establishing the methodology and the hours available per region. Each U.S. metropolitan region is treated as a separate market for new residential and commercial development. Therefore a separate set of Brownfield Redevelopment and Trend Growth scenarios will be created for each metropolitan region. By treating each metropolitan region as a separate market for development, this scenario addresses the fact that different metropolitan regions face different development pressures and can be expected to experience different development rates and outcomes.

The following outcome metrics will be modeled for each regional scenario. Outcomes will also be aggregated to quantify national scale environmental benefits or impacts.

- Net change in impervious surface area
- Net change in vehicle miles traveled
- Net change in greenhouse gas emissions
- Net change in criteria air pollutants
- Percent difference in residential walk trips (between scenarios)
- Percent difference in residential transit trips (between scenarios)
- Percent difference in commute transit trips (between scenarios)

As noted above, separate Brownfield Redevelopment and Trend Growth scenarios will be created for each metropolitan region. The Brownfield Redevelopment scenario begins with the assumption that up to 80 percent of the region-wide growth projected to occur between 2010 and 2030 will be accommodated on brownfield properties. If a region is projected to have zero or negative growth over the next twenty (20) years, this study assumes that no brownfields will be redeveloped. If 80 percent of projected region-wide growth is less than total brownfield capacity the scenario will first build out the brownfield property closest to the regional core and proceed to build out additional properties further from the core until 80 percent of projected region-wide growth is allocated. Density of development on brownfield properties is capped to not exceed the highest density block group within one half mile.

One issue that complicates the development of scenarios for evaluation in this study is that a portion of the Nineteen Thousand (19,000) brownfield properties that have received EPA assistance have already been reused or redeveloped and the rest have not yet been put to reuse. This study seeks to evaluate the total environmental benefits of redeveloping each of these groups of properties. So the Brownfield Redevelopment scenario distinguishes growth that occurred on brownfields prior to the 2010 census from growth that is assumed to occur between 2010 and 2030 on the remaining brownfield properties. Likewise the Trend Growth scenario also distinguishes between these two categories of growth in order to create a valid comparison.

V. QUALITY ASSURANCE (QA) REQUIREMENTS

Check [X] Yes if the following is required or [ ] NO if the following is not required. The Contractor shall submit with their technical proposal a short written Quality Assurance Project Plan for any project that is developing environmental measurements or a Quality Assurance Supplement to the Quality Management Plan for any project which generates environmental data using models.

VI. TASKS AND DELIVERABLES

The TOPO shall review all deliverables in draft form and provide revisions and/or comments to the contractor. The contractor shall incorporate the TOPO's comments 14 days after receipt of comments. Final deliverable shall be in MS Word format.

From time to time, as new information develops, the contractor shall organize Guidance Calls with various experts for the purposes of scoping issues, confirming topics of research and methodological approaches, and making sure tasks and the overall project are on track and focusing on relevant topics and issues. Technical

direction, when appropriate, will be provided by the TOPO.

Contractor personnel shall at all times identify themselves as contractor employees and shall not present themselves as EPA employees. Furthermore, they shall not represent the views of the U.S. Government, EPA, or its employees. In addition, the contractor shall not engage in inherently governmental activities, including but not limited to actual determination of EPA policy and preparation of documents on EPA letterhead.

Task One – Categorize brownfields properties (Contract Reference: II.A.1. Qualitative research, quantitative analysis, modeling, and database management)

The contractor shall write a brief memo documenting the proposed methodology and critical assumptions for categorizing brownfields properties into two different groups. The groups will be divided by size in acres of brownfield sites. This step is necessary in order to move forward with the analysis, because it will designate those brownfield sites which are larger and warrant individualized attention as to their redevelopment status, while the smaller sites will be analyzed with less detail. It is necessary to make this distinction in order to allow for a nation-wide project.
The first group will consist of larger brownfields (in acres), which are most likely to have a proportionally greater impact on the study findings. Also, brownfield properties that are relatively large proportion of the surrounding block group will have a larger impact than those which are smaller (based on the ability of the brownfield redevelopment itself to affect the measurable built environment conditions of the entire block group). Finally, the larger the brownfield, the more likely it is that information about its planned redevelopment will be readily accessible online. The other group will consist of the remainder of the brownfields in the ACRES database.

The contractor shall participate in a one hour kick off conference call to discuss the content and scope of the modeling study. The purpose of this call is for the contractor to provide feedback, ask for clarification about the information provided where necessary, and to discuss additional analysis or review items that could be included in the write up from this task.

The contractor shall perform additional internal validation checks for data consistency. The contractor shall conduct a redeveloped pool statistical analysis to identify which of the factors within the ACRES database may lend themselves to analysis protocols. In addition, the contractor shall engage OBLR in staff in several exploratory discussion about how to use the ACRES data effectively and represent their program goals.

Task Two - Determine development scenarios (Contract Reference: II.A.1. Qualitative research, quantitative analysis, modeling, and database management)

As part of this study the contractor shall model the outcomes of two development scenarios. Scenario 1 (“Brownfield Redevelopment”) and Scenario Two (2) (“Trend Growth”). The contractor shall begin this task with a one hour conference call with EPA to discuss the methodology for regional development growth pattern projections which will be used to guide the scenarios. During and in preparation for this Task, the contractor shall participate in weekly calls with EPA. These calls will give the contractor an opportunity to provide feedback, ask for clarification where necessary, and for EPA to narrow the scope of the study as appropriate. It is anticipated that these weekly calls will last no more than one (1) hour each.

Scenario 1: Brownfield Redevelopment Scenario
The brownfield redevelopment scenario assumes the brownfield sites will be prioritized for redevelopment according to regional development growth projections.

Prior to starting the modeling, the contractor shall provide to EPA a proposed methodology for the proposed environmental modeling including the following:

- Brownfield data cleanup and ACRES data prep.
- Summarize existing conditions within one half the radius of source block group.
- Select all Census block groups with centroid closer than one half mile to origin.
- Identify any correlation between reuse and existing neighborhood conditions.
- Summarize developed land area by use, density
- Summarize future (post-redevelopment) land use for properties in ACRES database
    - When possible, determine actual or planned reuse of individual brownfields in ACRES, otherwise use reuse sample data to develop brownfield reuse assumptions).
    - Density of redevelopment on brownfield properties will not exceed maximum density found within on half mile.
    - For each metro region, total housing and employment growth on brownfields after 2010 will not exceed projected twenty-year region-wide growth trend.

Scenario 2 - Trend Growth development scenario
Prior to starting the modeling, the contractor shall provide to EPA a proposed methodology for the proposed environmental modeling including the following:

- Identify highest growth Census block groups.
- Select Census block groups with housing growth. Calculate percentage of all regional growth for each.
- Develop probabilistic sampling model for alternative development scenario.

Both scenarios shall generate outcomes which represent the impact of the redevelopment scenario on the environment. These outcomes shall include:

- Net change in impervious surface area (from current to future scenarios)
- Net change in vehicle miles traveled (from current to future scenarios)
- Net change in greenhouse gas emissions (from current to future scenarios)
- Net change in criteria air pollutants (from current to future scenarios)
- difference in residential walk trips (between scenarios)
- Percent difference in residential transit trips (between scenarios)
- Percent difference in commute transit trips (between scenarios)

In addition, the contractor shall explore up to 3 additional storm water models for enhanced analysis to capture more water quality related benefits including the LTHIA GIS model and the US Forest Service iTree model.
The contractor shall provide EPA with the first draft of the methodology three weeks from the first kick off conference call. EPA will review the methodology along with an internal peer review and provide consolidated comments. The contractor shall respond to the consolidated comments and provide EPA a second draft within seven (7) days of receiving comments from EPA. The contractor shall provide to EPA a second draft within five (5) days of receiving comments from EPA.

Task Three – Conduct Draft Analysis (Contract Reference: II.A. 2. Development and analysis of Policy Options)

The contractor shall conduct a draft analysis with four (4) regions with representative population growth and size. This task will begin with a one hour conference call during which the contractor will provide details and options for EPA to consider and COR will decide on Four (4) representative regions. The contractor shall hold a 45 minute check-in briefing call with EPA to review initial results.

The contractor shall expand the scope to include up to 20 additional US metropolitan regions to complete the fuller analysis as initially envisioned in the original project scope. The contractor shall also facilitate a broad stakeholder engagement process EPA to validate and vet the analytical process.

Task Four – Draft Report: Assessing the Potential Environmental Benefits of Brownfield Redevelopment: A National Study (Contract Reference: II.C. Communication and outreach)

The contractor shall begin this task with a conference call with EPA not to exceed forty-five (45) minutes in length. The purpose of this call is to discuss the information provided and any additional analysis or review items that could be included in the write up from this task, based on feedback from the draft analysis. The contractor shall develop an annotated outline of the report and incorporate any comments from EPA.
The contractor shall draft a ten (ten) to fifteen (15) page document, tentatively titled "Assessing the Potential Environmental Benefits of Brownfield Redevelopment: A National Study" using the information prepared in this task order. This report should incorporate comments from EPA from the deliverable in Task Three (3) and follow the annotated outline agreed upon in the most recent conference call. The report may have the following sections:

- Executive Summary
- Description of the modelling and analysis
- Technical documentation
- Lessons learned

This report shall be an enhanced publication document.

In drafting the report, the contractor shall use information generated from this task order and other information provided by EPA.

The contractor shall draft the report within two weeks of completing Tasks one (1) and two (2). EPA along with an internal peer review panel will provide comments on the draft report and the contractor shall respond to those consolidated and streamlined comments within seven (7) days. The contractor shall respond to a Second (2nd) and final set of comments from EPA within seven (7) days of receiving EPA comments.

The contractor shall provide the following specific deliverables to the EPA TOPO:

	Deliverable	Form and Quantity	Schedule
Task One	Memo: Methodology and Assumptions for Categorizing Brownfields Properties	As defined in Task One (1)	Within Fourteen (14) calendar days of kick-off conference call, as described in Task One (1)
Task Two	First Draft of Memo: Determining Development Scenarios	As defined in Task Two (2)	Within Twenty one (21) calendar days of completion of Task One (1)
	Second Draft of Memo: Determining Development Scenarios	As defined in Task Two (2)	Within Fourteen (14) calendar days of receiving comments on First Draft from TOPO
Task Three	Draft Analysis: Results from Four Regions	As defined in Task Three (3)	Within Fourteen (14) calendar days of conference call, as described in Task 3

Task Four	First Draft of Final Report	As defined in Task Four (4)	Within Twenty one (21) calendar days of conference call, as described in Task four (4)
	Final Draft of Final Report	As defined in Task Four (4)	Within Seven (7) calendar days upon receiving second set of comments from TOPO

VII. Miscellaneous

Software Application files, delivered to the Government, shall conform to the requirements relating to accessibility as detailed to the 1998 amendments to the Rehabilitation Act, particularly, but not limited to, § 1194.21 Software applications and operating systems and § 1194.22 Web-based intranet and internet information and applications. See: http://www.section508.gov/

Preferred text format: MS Word, Office 2007/2013